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Yoshida et al.

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(54) **DEVELOPER ACCOMMODATING UNIT,
PROCESS CARTRIDGE AND
ELECTROPHOTOGRAPHIC IMAGE
FORMING APPARATUS**

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G03G 2215/0682 (2013.01); **G03G 2215/0687**
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See application file for complete search history.

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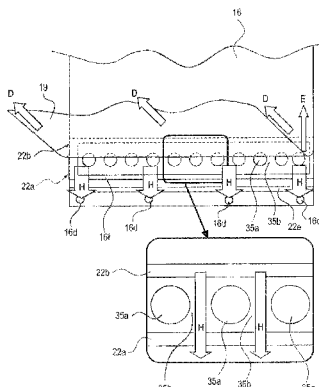
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Scinto

(57) **ABSTRACT**

A developer accommodating unit includes: a flexible con-
tainer including an opening for permitting discharge of a
developer; a sealing member for forming a bonding portion
between itself and the flexible container; an unsealing mem-
ber; and an accommodating container. The bonding portion
includes a first bonding portion extending in a longitudinal
direction of the sealing member at a periphery of the opening
in an upstream side of a peeling direction of the sealing
member, a second bonding portion extending in the longitu-
dinal direction at the periphery of the opening in a down-
stream side of the peeling direction, and a third bonding
portion bonded upstream of the first bonding portion with
respect to the peeling direction. When the sealing member
exposes the opening, the bonding portion is peeled in the
order of the third bonding portion, the first bonding portion
and the second bonding portion.

20 Claims, 16 Drawing Sheets



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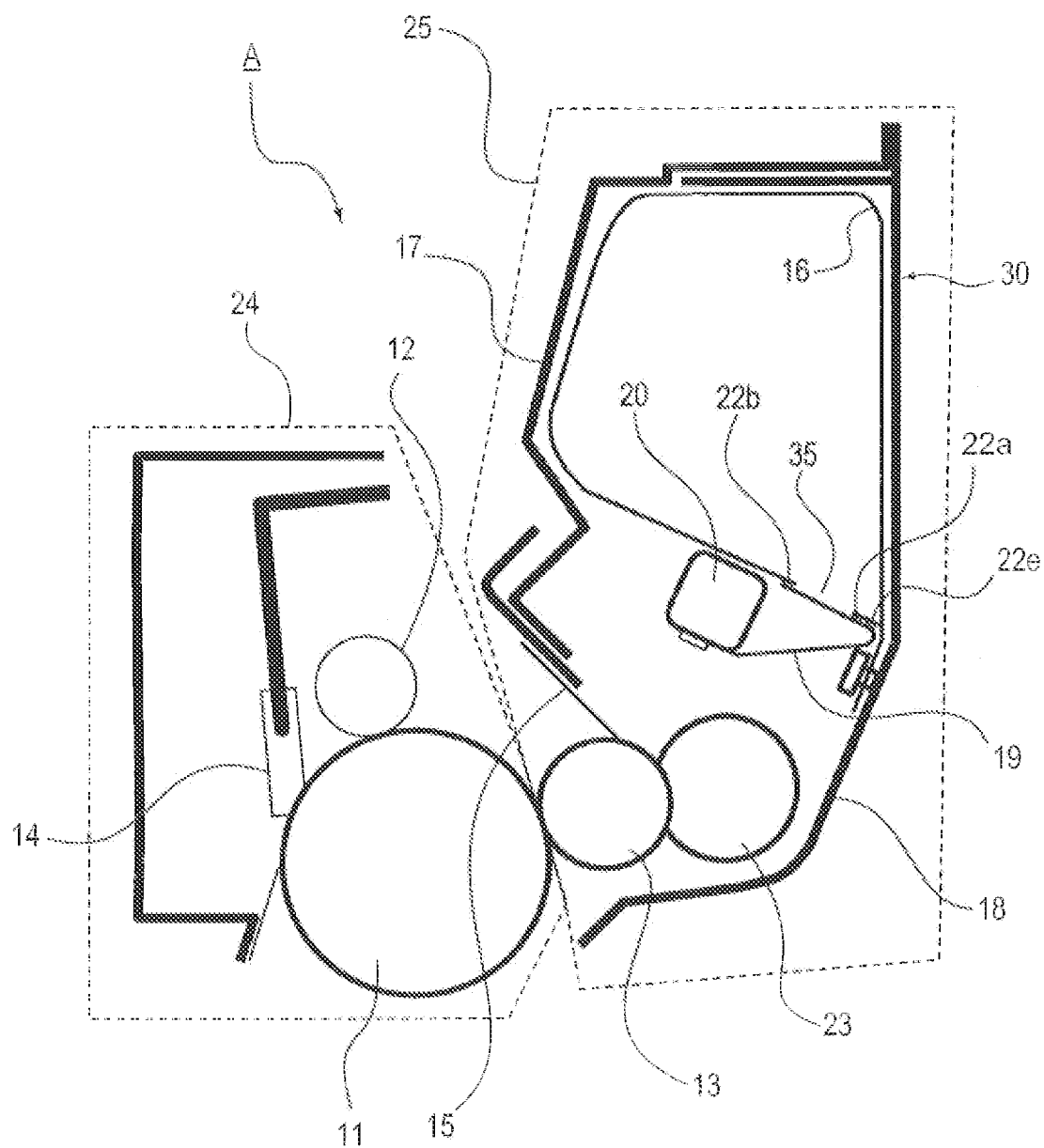


Fig. 1

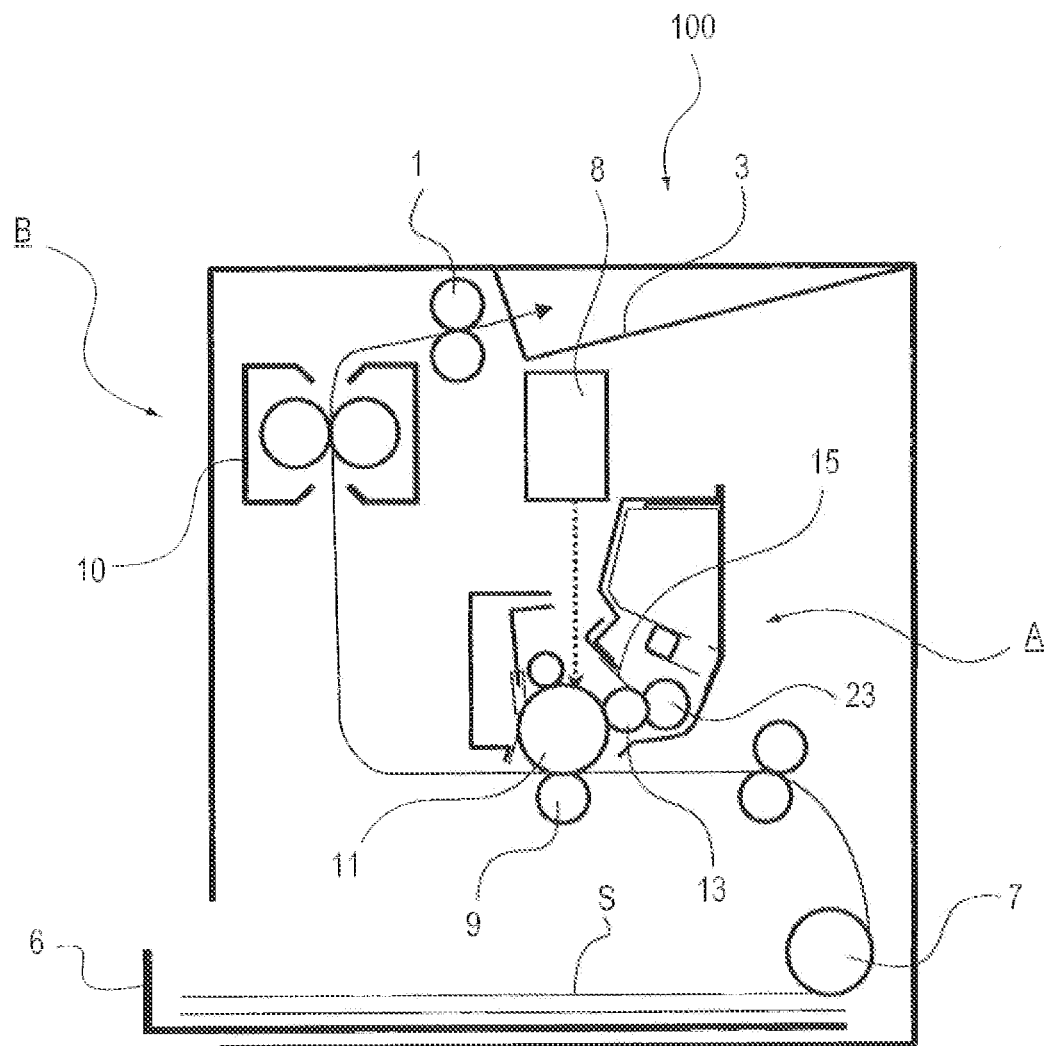


Fig. 2

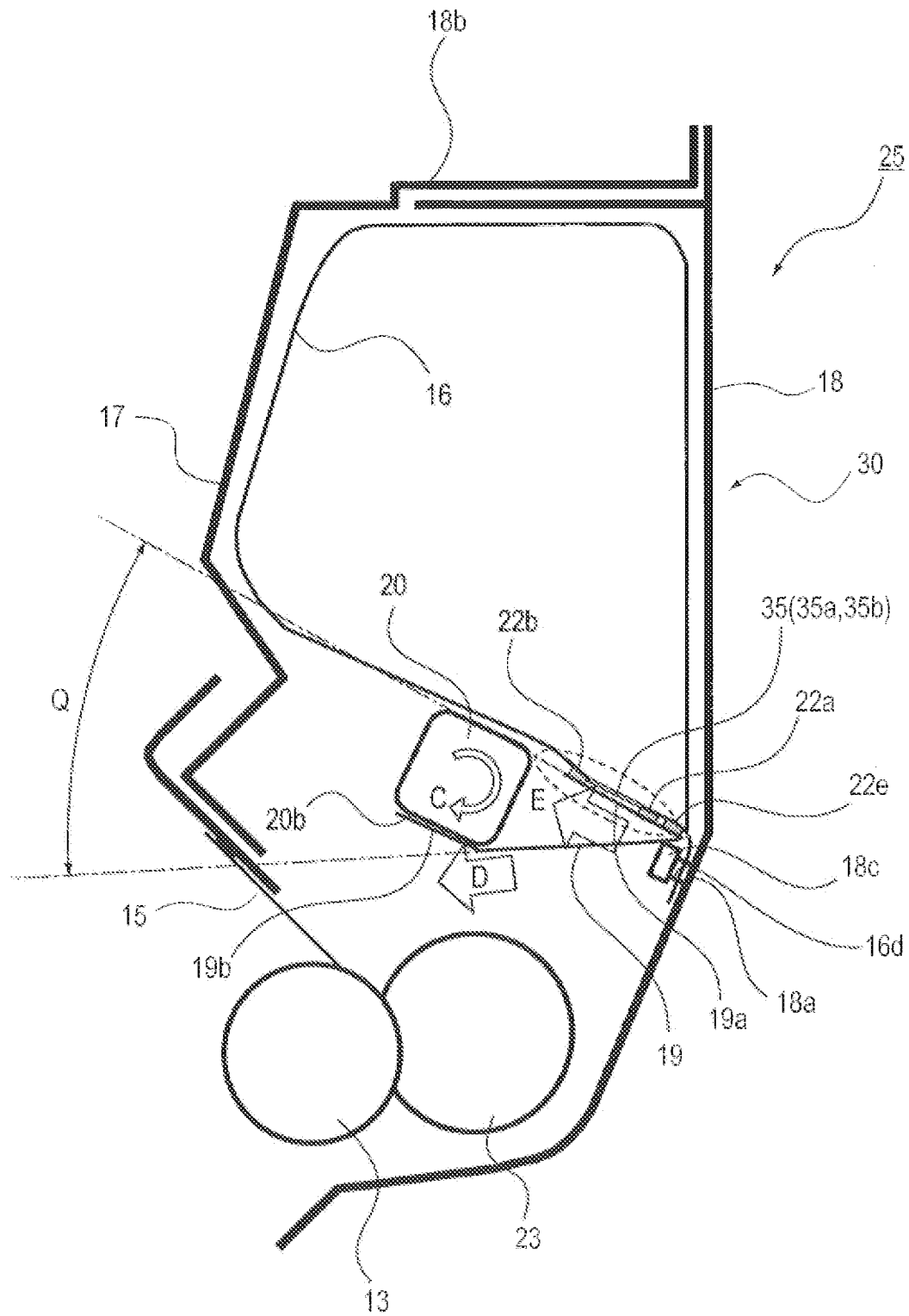


Fig. 3

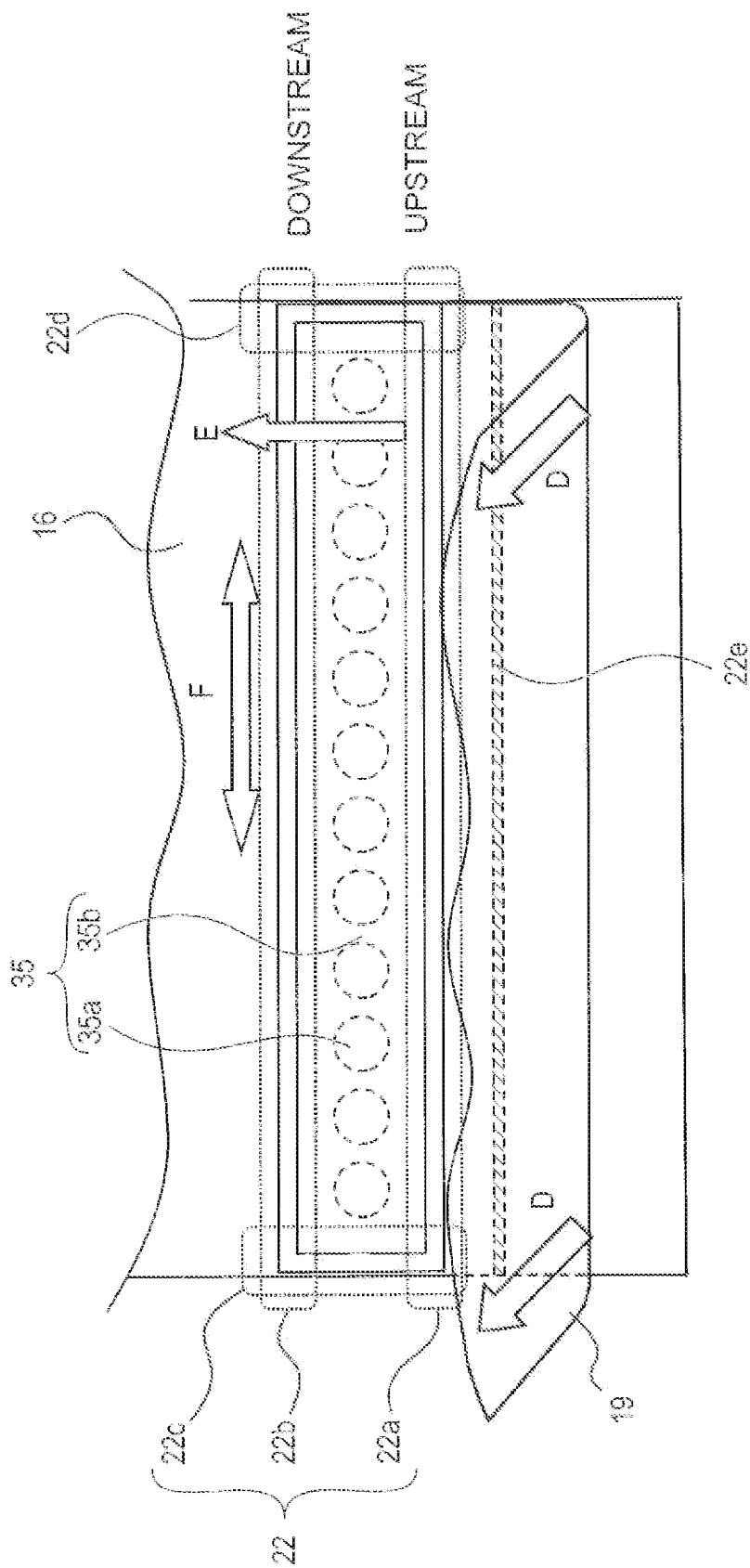


Fig. 4

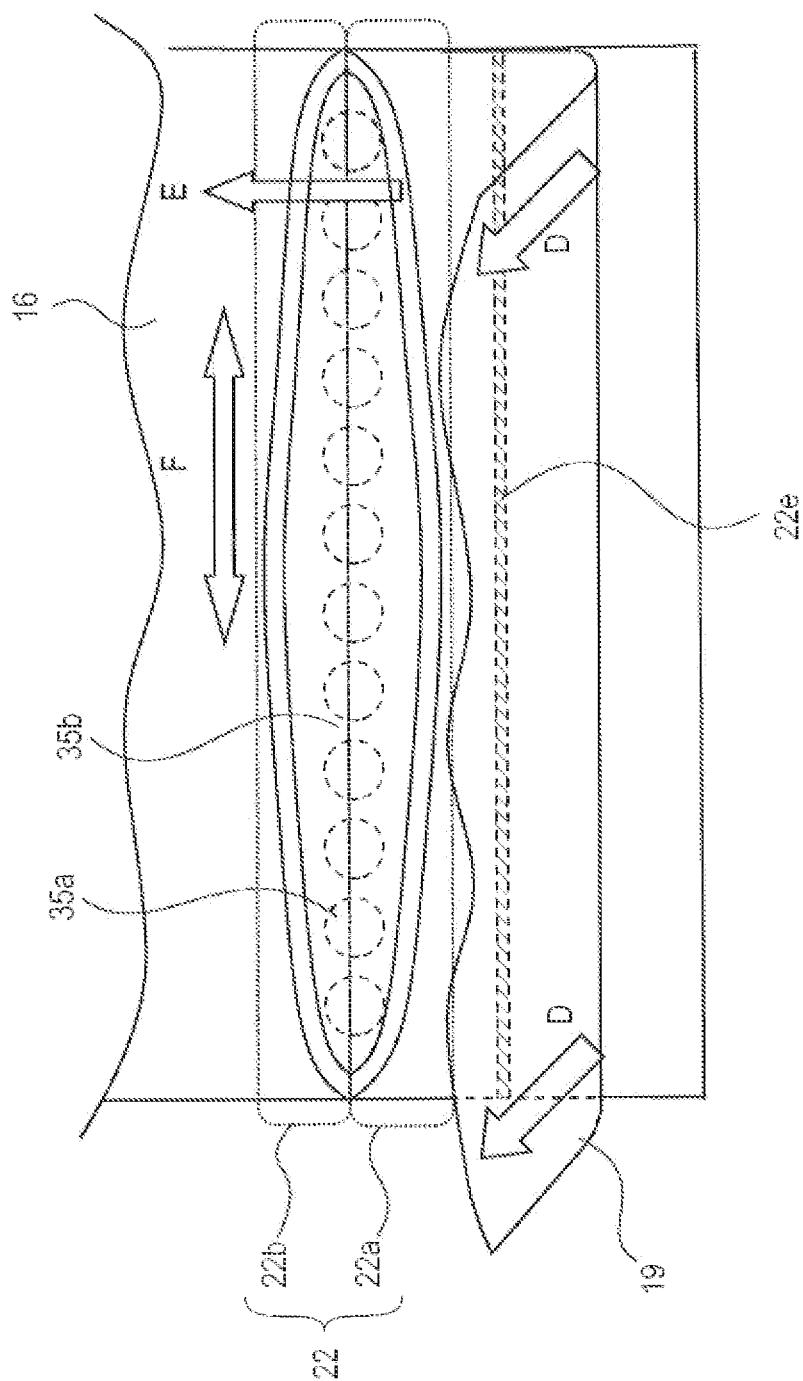


Fig. 5

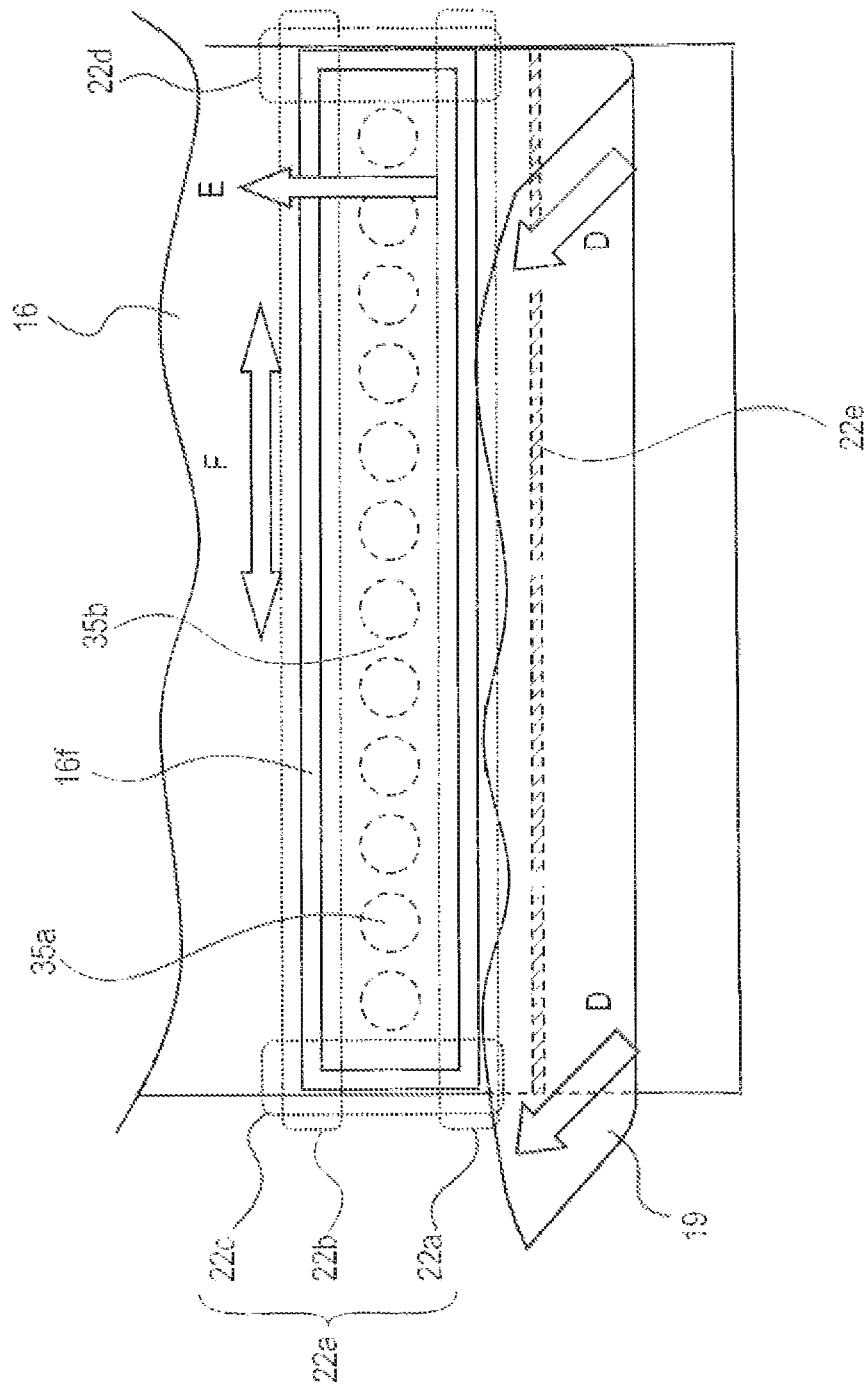


Fig. 6

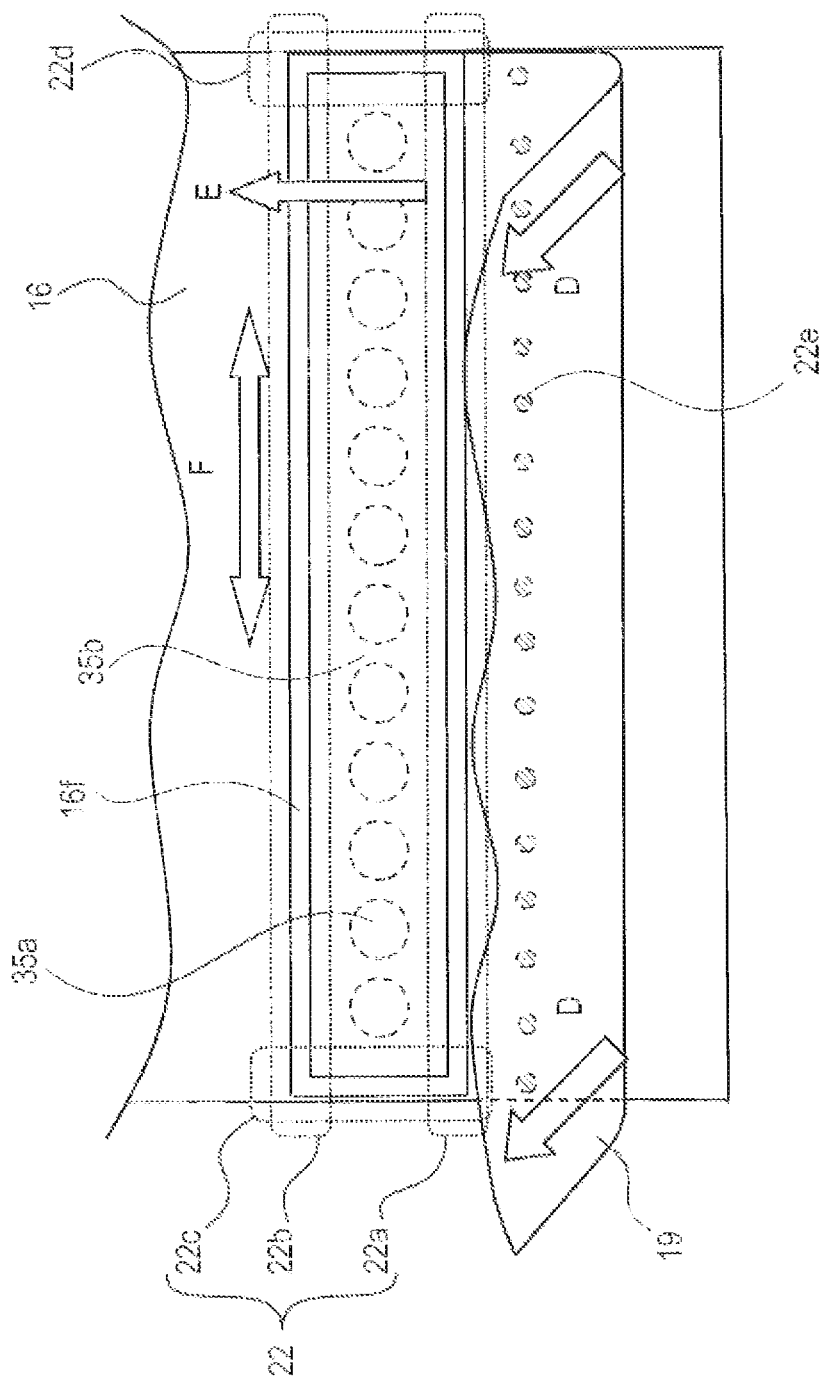


Fig. 7

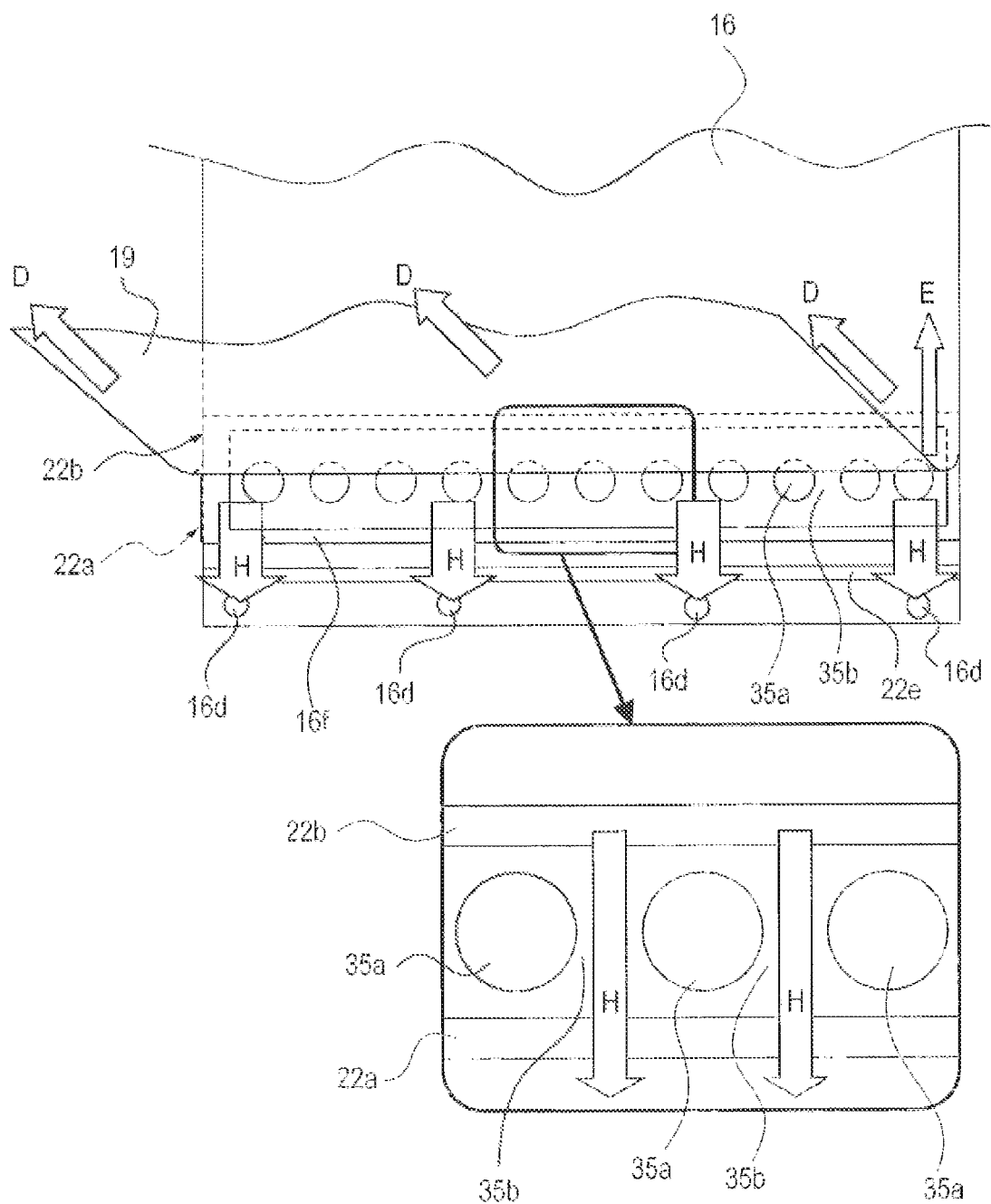
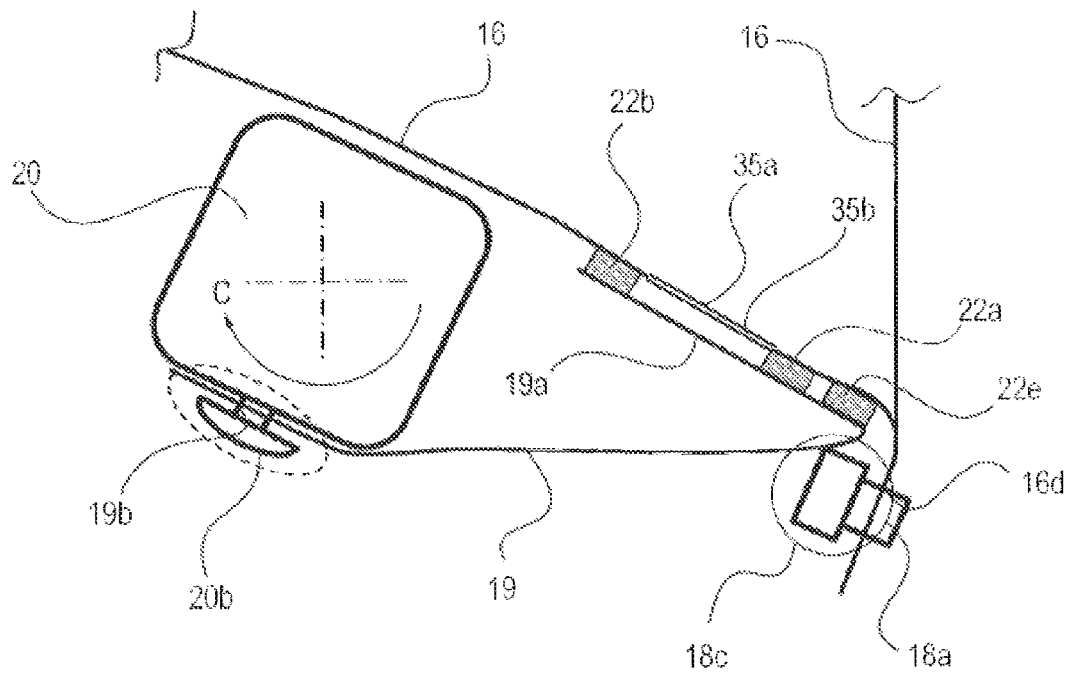


Fig. 8

(a)



(b)

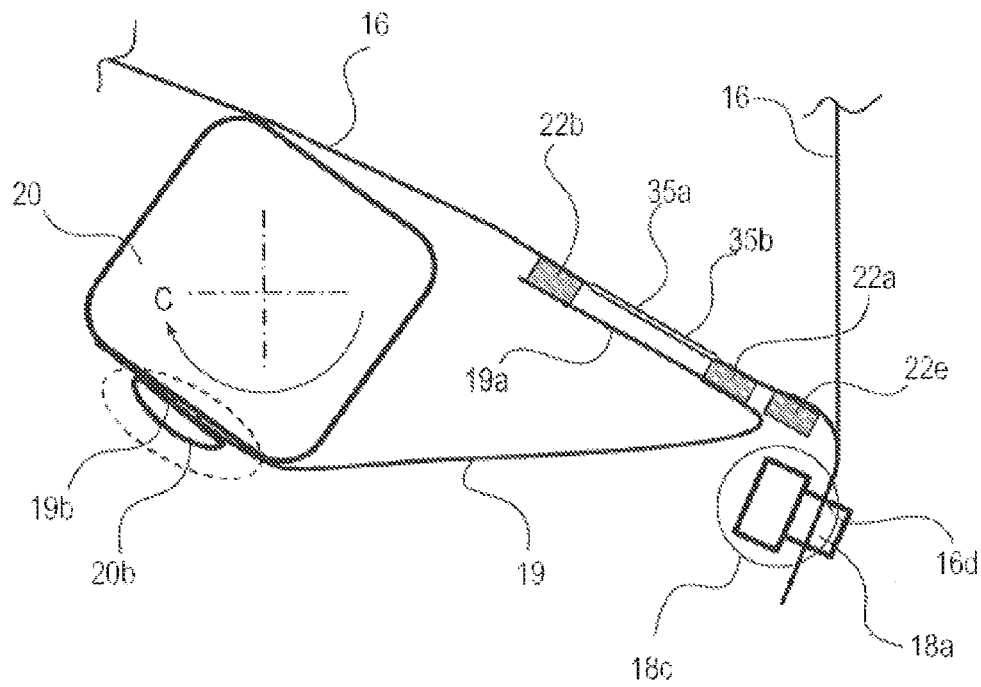
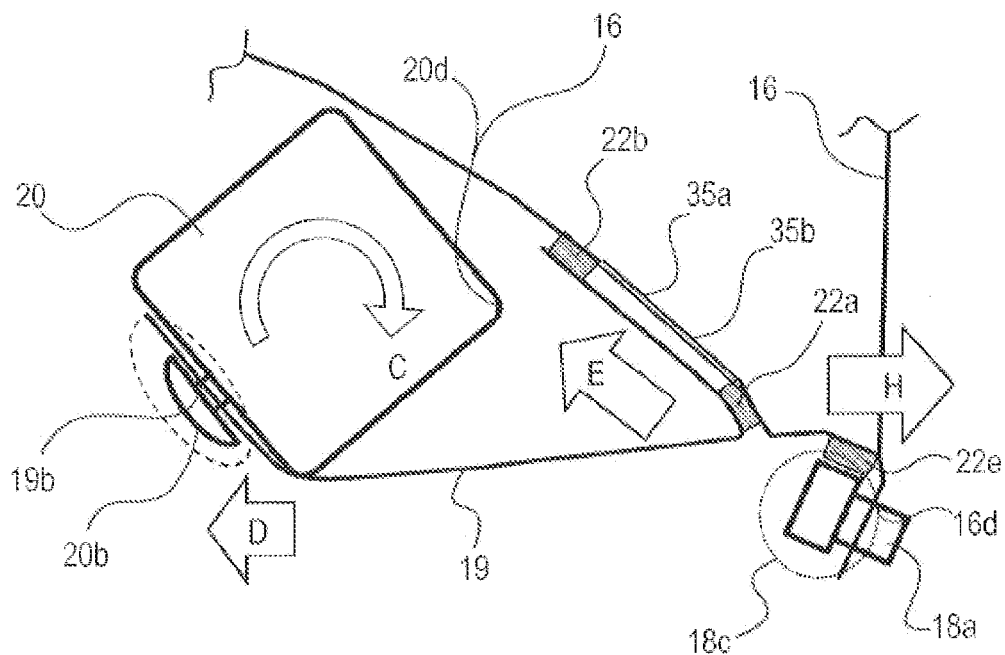


Fig. 9

(a)



(b)

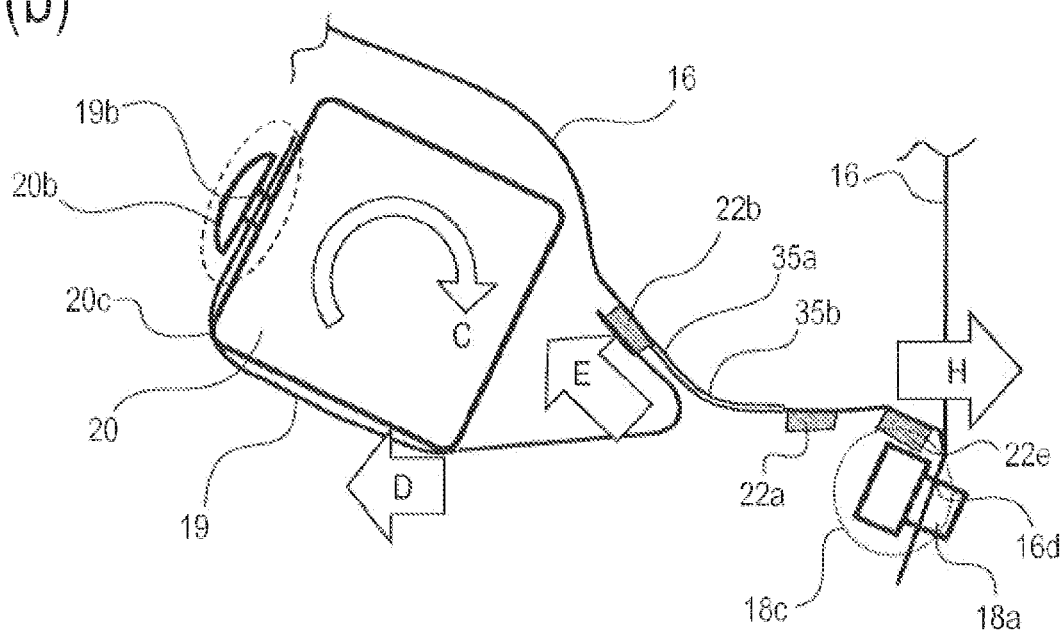
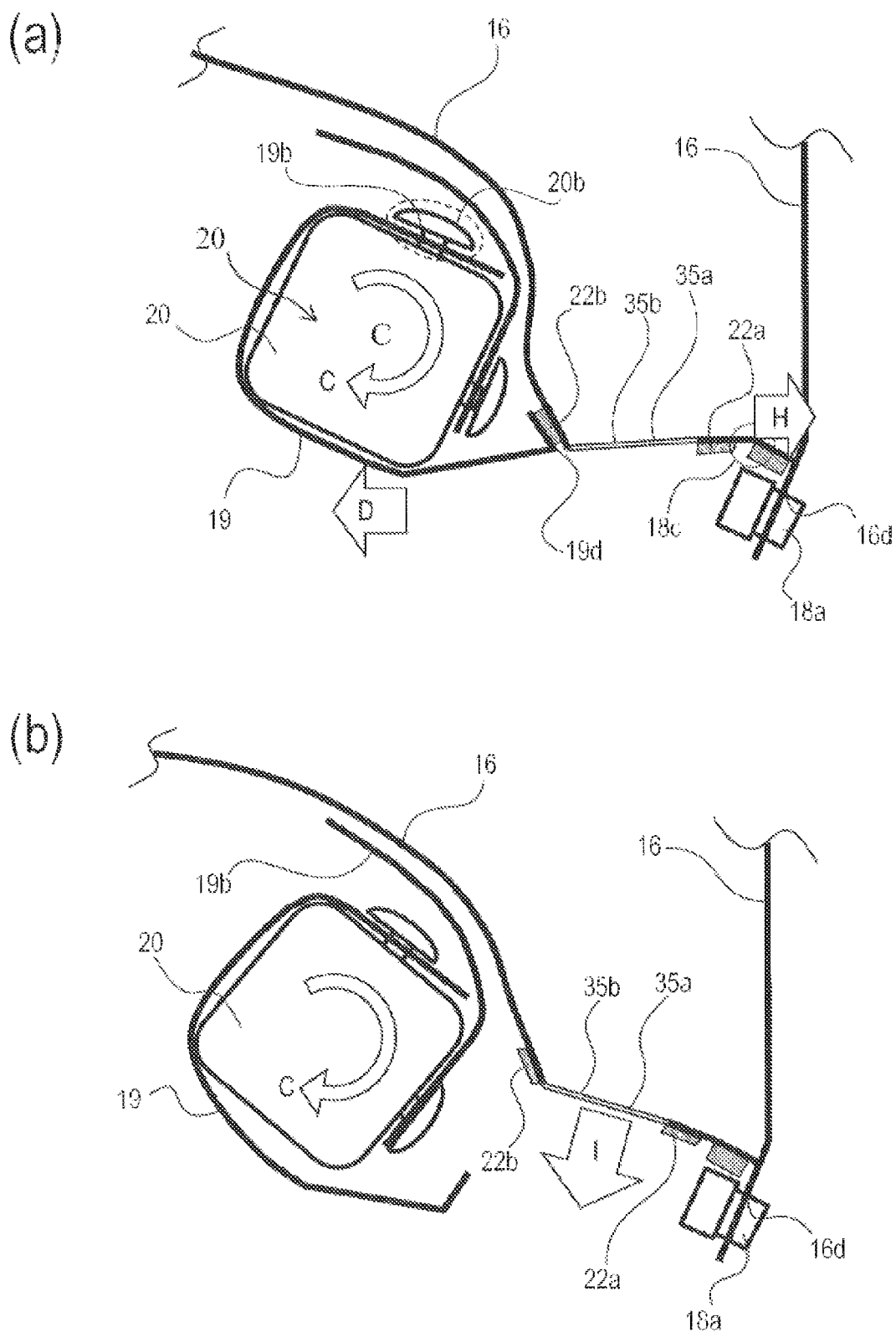


Fig. 10



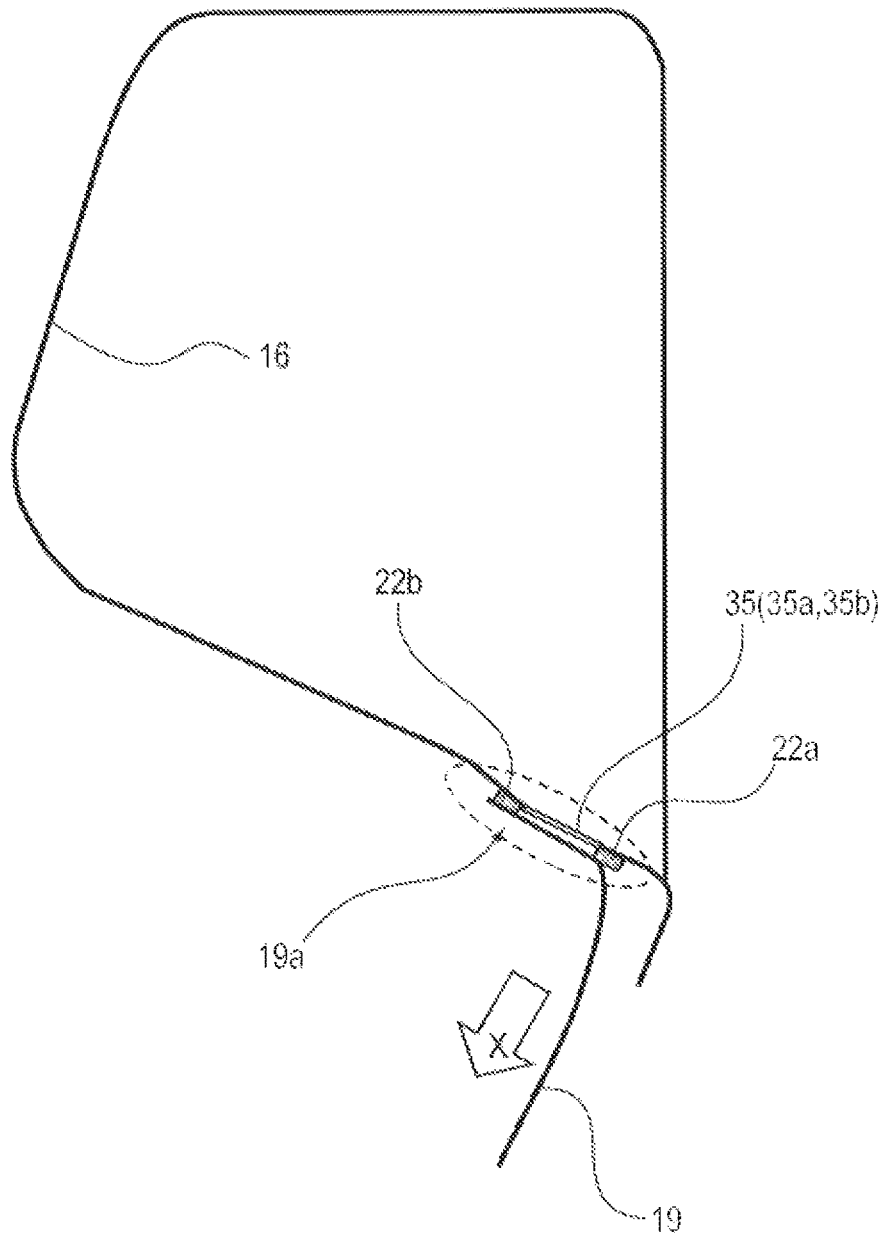


Fig. 12

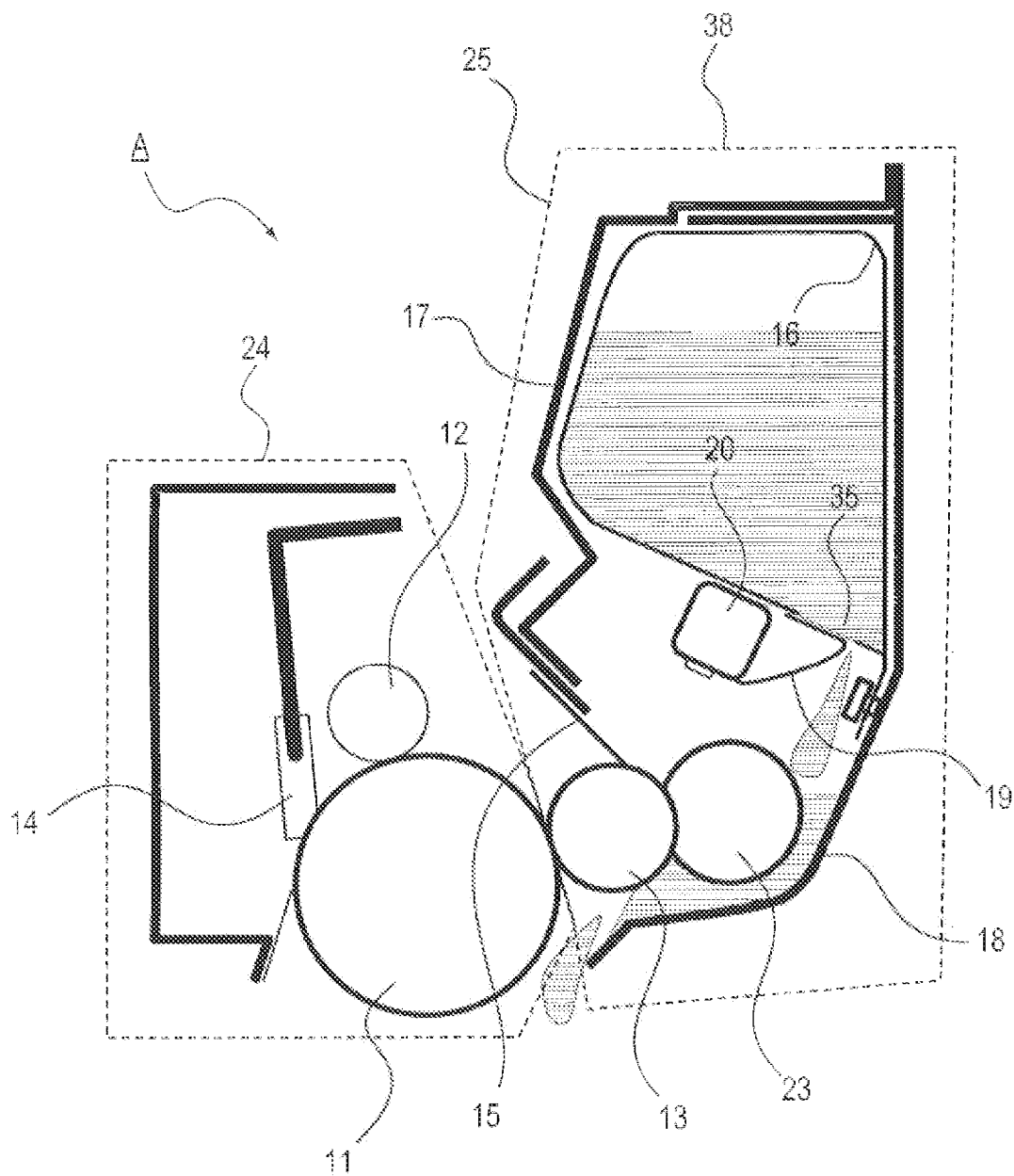


Fig. 13

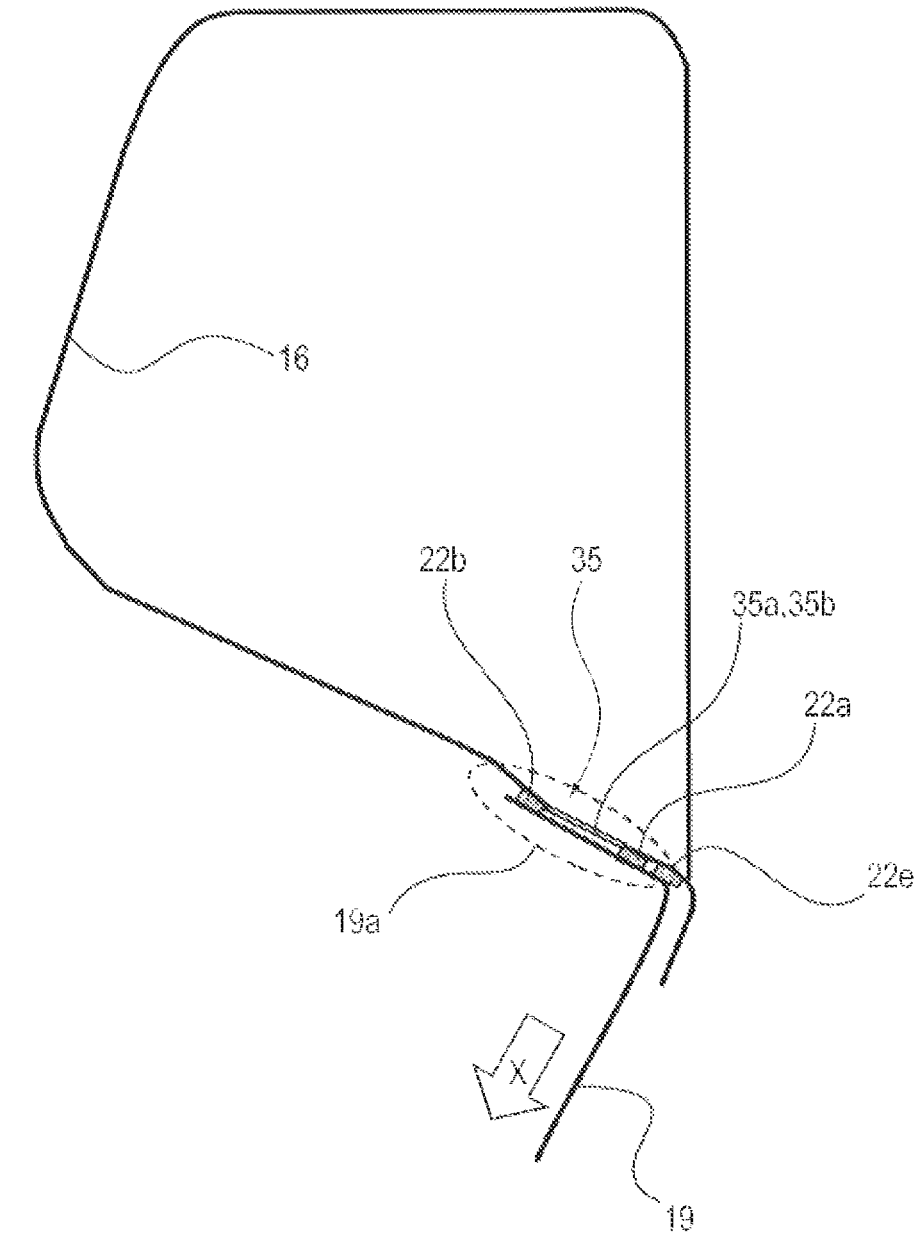


Fig. 14

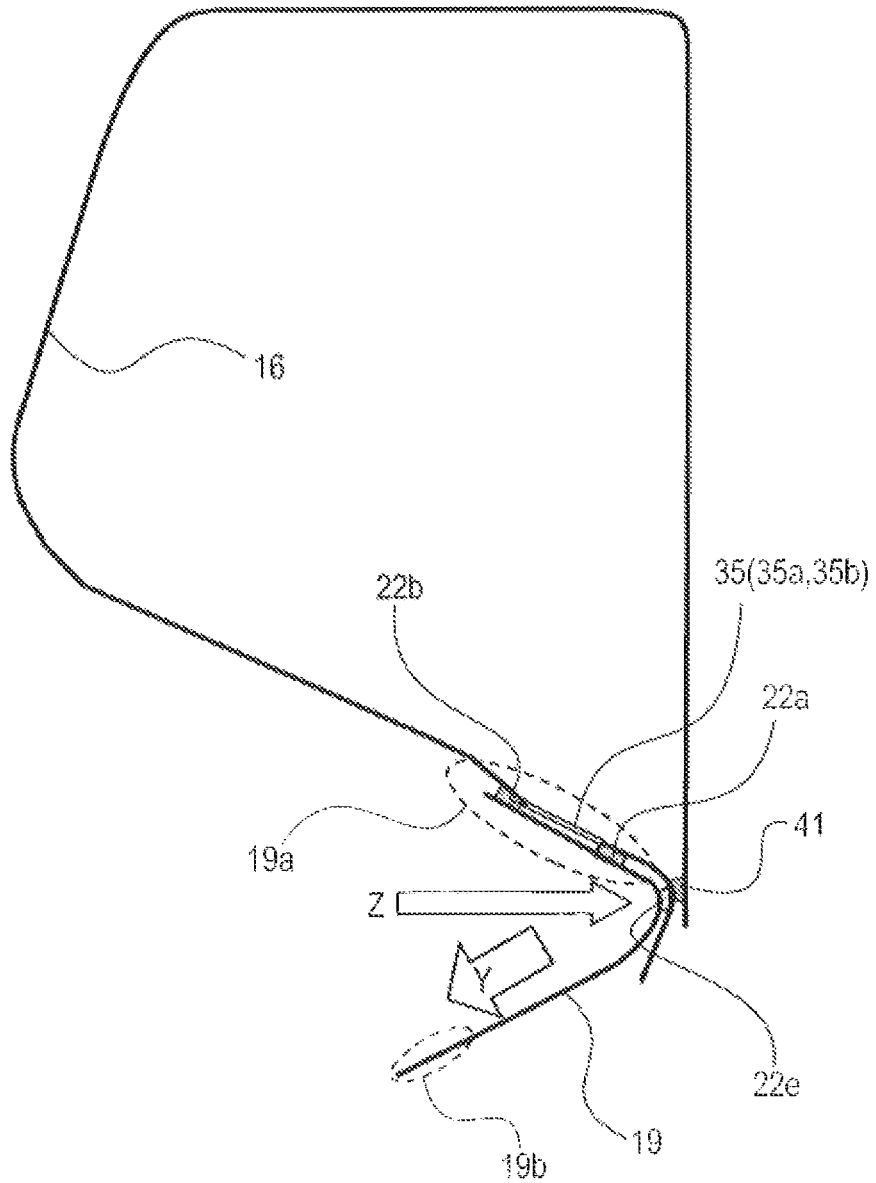


Fig. 15

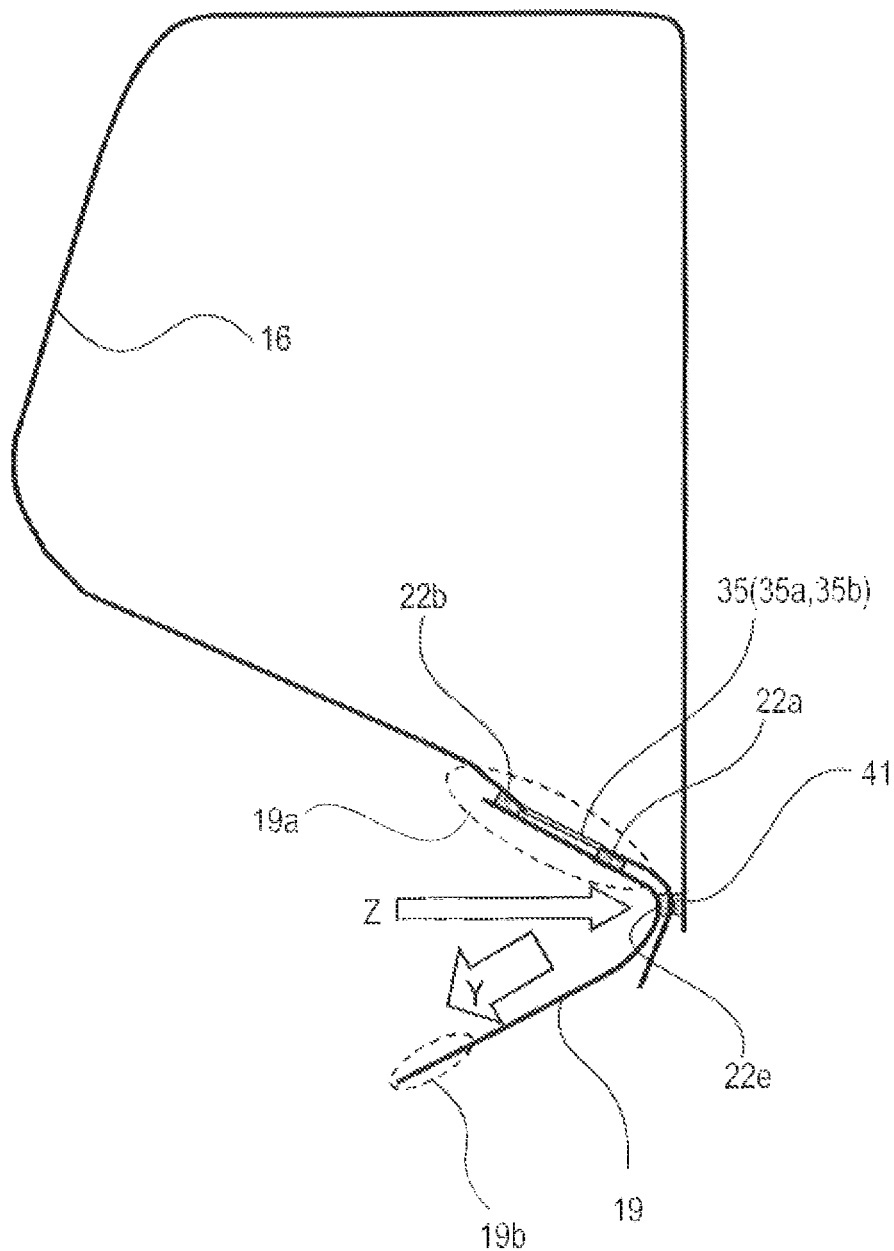


Fig. 16

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DEVELOPER ACCOMMODATING UNIT, PROCESS CARTRIDGE AND ELECTROPHOTOGRAPHIC IMAGE FORMING APPARATUS

FIELD OF THE INVENTION AND RELATED ART

The present invention relates to a developer accommodating unit for accommodating a developer, a process cartridge including the developing accommodating unit and an electrophotographic image forming apparatus including the process cartridge.

The image forming apparatus forms an image on a recording material (medium) by using, e.g., an electrophotographic image forming process and may include, e.g., an electrophotographic copying machine, an electrophotographic printer (such as an LED printer or a laser beam printer), an electrophotographic facsimile machine, and the like. Further, the process cartridge refers to a cartridge, prepared by integrally assembling at least a developing device accommodating a developing means and a developer, detachably mountable to a main assembly of the image forming apparatus, or refers to a cartridge, prepared by integrally assembling the developing device and a photosensitive member unit at least including a photosensitive member, detachably mountable to the main assembly of the image forming apparatus.

In a conventional electrophotographic image forming apparatus, a process cartridge type in which a photosensitive drum and process means actable on the photosensitive drum are integrally assembled into a cartridge and this cartridge is detachably mountable to the main assembly of the image forming apparatus is employed. As an invention employing such a process cartridge type, an invention described in Japanese Laid-Open Patent Application (JP-A) Hei 4-66980 is disclosed. In JP-A Hei 4-66980, a toner bag (flexible container) is accommodated inside a housing. An opening of this toner bag is closed by an opening tape (sealing member). When the opening tape is pulled, the opening is opened, so that a toner (developer) is discharged from the toner bag and is supplied to a developing sleeve.

However, the invention disclosed in JP A Hei 4 66980 involves the following problem. Although the opening of the flexible container is sealed by the sealing member in a state in which the developer is accommodated in the flexible container, an unexpected force acts on a bonding portion, during transportation or the like, where the sealing member is bonded to a portion in the neighborhood of the opening, so that there is a possibility that a part of the bonding portion is peeled. By this peeling, a performance of sealing the developer by the bonding portion is lowered. Further, in a process until the process cartridge is delivered to a user and then the user mounts the process cartridge in the main assembly of the image forming apparatus, there is a possibility that the peeling of the bonding portion advances and thus the developer leaks out from the flexible container to contaminate a hand of the user.

SUMMARY OF THE INVENTION

A principal object of the present invention is to provide a developing accommodating unit capable of reducing, in a constitution in which an opening of a flexible container in which a developer is accommodated is sealed by a sealing member, a phenomenon such that an unexpected force acts on a bonding portion for bonding the sealing member at a periphery of the opening.

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According to an aspect of the present invention, there is provided a developer accommodating unit comprising: a flexible container including an opening for permitting discharge of a developer; a sealing member for forming a bonding portion between itself and the flexible container to seal the opening; an unsealing member, mounted on the sealing member, for unsealing the sealing member; and an accommodating container for accommodating therein the flexible container, the sealing member and the unsealing member, wherein the bonding portion includes a first bonding portion extending in a longitudinal direction of the sealing member as a periphery of the opening in an upstream side of a peeling direction of the sealing member, a second bonding portion extending in the longitudinal direction at the periphery of the opening in a downstream side of the peeling direction, and a third bonding portion bonded upstream of the first bonding portion with respect to the peeling direction, and whereby when the sealing member exposes the opening, the bonding portion is peeled in the order of the third bonding portion, the first bonding portion and the second bonding portion.

These and other objects, features and advantages of the present invention will become more apparent upon a consideration of the following description of the preferred embodiments of the present invention taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a sectional view of a cartridge.

FIG. 2 is a sectional view of an image forming apparatus.

FIG. 3 is a sectional view of a developing device.

FIG. 4 is a plan view showing a structure of a discharging portion.

FIG. 5 is a plan view showing a modified example of the discharging portion.

FIGS. 6 and 7 are plan views each showing a modified example of a third bonding portion.

FIG. 8 is a plan view showing the discharging portion and openings.

Parts (a) and (b) of FIG. 9, parts (a) and (b) of FIG. 10 and parts (a) and (b) of FIG. 11 are partly enlarged sectional views each showing a developer bag.

FIG. 12 is a sectional view showing a developer bag in a comparison example.

FIG. 13 is a sectional view showing a cartridge in the comparison example.

FIG. 14 is a sectional view showing the developer bag.

FIG. 15 is a sectional view of a developer bag in Embodiment 2.

FIG. 16 is a sectional view of a modified example of the developer bag in Embodiment 2.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinbelow, embodiments for carrying out the present invention will be exemplarily and specifically described on the basis of Embodiments with reference to the drawings. However, dimensions, materials, shapes, relative arrangements, and the like of constituent elements described in the following embodiments are appropriately changed depending on constitutions or various conditions of devices (apparatuses) to which the present invention is applied, and therefore the scope of the present invention is not limited thereto unless otherwise specified.

Embodiment 1

FIG. 1 is a sectional view of a process cartridge A. The cartridge A includes the image bearing member and process

means actable on the image bearing member. Examples of the process means may include, e.g., a charging means for electrically charging the surface of the image bearing member, a developing device for forming an image on the surface of the image-bearing member, and a cleaning means for removing a developer (containing a toner, a carrier and the like) remaining on the surface of the image bearing member.

The cartridge A is prepared by integrally assembly a cleaner unit 24 and a developing accommodating unit 25 (developing device), and is configured to be detachably mount able to an image forming apparatus main assembly B shown in FIG. 2. The cleaner unit 24 includes a photosensitive drum 11 as an electrophotographic photosensitive drum which is the image bearing member, a charging roller 12 as the charging means, an elastic cleaning blade 14 as the cleaning means. The developing accommodating unit 25 includes a first frame 17 and a second frame 18. The developing accommodating unit 25 includes therein a developing roller 13 as a developing means, a developing blade 15, a (developer) supplying roller 23 and an accommodating container 30 in which the developer is accommodated. The developing roller 13 and the developing blade 15 are supported by the first frame 17.

FIG. 2 is a sectional view of an image forming apparatus 100 as an electrophotographic image forming apparatus. The cartridge A is mounted in the apparatus main assembly 8 and is used for image formation. A sheet S is fed by a feeding roller 7 from a sheet cassette 6 provided at a lower portion of the apparatus, and in synchronism with this feeding of the sheet, an exposure device 8 selectively exposes the photosensitive drum 11 to light, so that a latent image is formed on the photosensitive drum 11.

The developer is supplied to the developing roller 13 (developer carrying member) by a sponge-like supplying roller 23, and is carried in a thin layer on the surface of the developing roller 13 by the developing blade 15. By applying a developing bias to the developing roller 13, the developer is supplied depending on the latent image to develop the latent image into a developer image. This developer image is transferred onto the sheet S conveyed by application of a bias voltage to a transfer roller 9. The sheet S is conveyed into a fixing device 10 in which the image is fixed on the sheet S, and then is discharged by a discharging roller 1 onto a discharge portion 3 at an upper portion of the apparatus.

FIG. 3 is a sectional view of the developing accommodating unit 23. Parts (a) and (b) of FIG. 9 are partly enlarged sectional views of a developer bag 16. Incidentally, the sectional views show a flat plane passing through an unsealing member 20, openings 35a and a fixed portion 16d of the developer bag 16 fixed to a fixing portion 18c of the second frame 18, and is cut along a flat plane perpendicular to a rotation shaft (axis) of the unsealing member 20. The developing accommodating unit 25 includes the developing roller 13 and the developing blade 15.

Incidentally, in this embodiment, the developing accommodating unit 25 as the developing device has a constitution including the developing roller 13 and the developing blade 15, but may also have a constitution from which the developer bag 16 is separated. However, in this case, such a relationship that the developing device includes the developing roller 13 and the developing blade 15, and the developing accommodating unit 25 includes the developer bag 16 is created.

Further, the developing accommodating unit 25 includes the accommodating container 30 in which the developer bag 16, a sealing member 19 and the unsealing member 20 are accommodated. The developer bag 16 as the flexible container includes openings 35a for permitting discharge of the

developer. The sealing member 19 seals the openings 35a before the unsealing member 20 moves (rotates) and exposes the openings 35a when the unsealing member 20 moves (rotates). The unsealing member 20 is mounted on the sealing member 19, and when the unsealing member 20 moves (rotates), applies tension to the sealing member 19 to unseal the openings 35a. The accommodating container 30 supports inside members such as the developing roller 13, the developing blade, and the like, and includes the first frame 17 and the second frame 18.

As shown in FIG. 3, the developer bag is accommodating therein the developer is sealed by the sealing member 19 at the plurality of openings 35a (FIG. 4) for permitting discharge of the developer. The accommodating container 30 includes therein the developer bag 10 and the unsealing member 20. The unsealing member 20 includes a fixing portion 20b for fixing the sealing member 19.

On the other hand, the sealing member 19 includes a fixed portion 19b, fixed to the fixing portion 20f of the unsealing member 20, defined in a base end side thereof (in a downstream side thereof with respect to a peeling direction described later). In the accommodating container 30, the fixed portion 19b of the sealing member 19 is fixed to the fixing portion 20b of the unsealing member 20. The developer bag 16 accommodates the developer therein and has a deformable bag shape, and in order to permit discharge of the developer accommodated, therein, includes the plurality of openings 35a at a discharging portion 35.

FIG. 4 is a plan view showing a structure of the discharging portion 35. As shown in FIG. 4, the developer bag 16 includes the discharging portion 35. The discharging portion 35 includes the plurality of openings 35a for permitting discharge of the developer inside the developer bag 16 and includes a connecting portion 35b for defining the plurality of openings 35a. The sealing member 19 covers the discharging portion 35, and a bonding portion 22 for bonding the developer bag 16 and the sealing member 19 continuously surrounds an outer edge portion of the discharging portion 35, thus unsealably bonding the developer bag 16 and the sealing member 19. In this way, the sealing member 19 confines the developer accommodated in the developer bag 16.

As shown in FIGS. 3 and 4, the developing accommodating unit 25 includes, between the developer bag 16 and the sealing member 19, the bonding portion 22 for bonding the developer bag 16 and the sealing member 19. In other words, the sealing member 19 is bonded to the developer bag 16 by bonding portions (22a, 22b, 22c, 22d and 22e), defined in another end side thereof (in an upstream side with respect to the peeling direction described later), for bonding the developer bag 16 and the sealing member 19.

The bonding portion 22 includes a first bonding portion 22a, a second bonding portion 22b, a first widthwise bonding portion 22c, a second widthwise bending portion 22d and a third bonding portion 22e. At the bonding portion 22, two bonding portions welded with respect to a longitudinal direction (arrow F direction), i.e., the first bonding portion 22a and the second bonding portion 22b, and two bonding portions welded with respect to a widthwise direction (arrow E direction), i.e., the first widthwise bonding portion 22c and the second widthwise bonding portion 22d are provided. The bonding portions having a rectangular shape defined by these four bonding portions which surround the discharging portion 35 are continuous.

A structure of each of the bonding portions 22 (22a to 22e) will be specifically described below. The first bonding portion 22a extends in the longitudinal direction (axial direction of the unsealing member 20) in a peeling direction upstream

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side of the sealing member 19 (in an upstream side of the arrow E direction) at a periphery of the openings 35a. That is, the first bonding portion 22a is disposed at a position upstream of the openings 35a with respect to the arrow E direction, and extends in the arrow F direction. The second bonding portion 22b extends in the longitudinal direction (axial direction of the unsealing member 20) in a peeling direction downstream side of the sealing member 19 (in a downstream side of the arrow E direction) at a periphery of the openings 35a. That is, the second bonding portion 22b is disposed at a position upstream of the openings 35a with respect to the arrow E direction, and extends in the arrow F direction.

Further, each at the first and second widthwise bonding portions 22c and 22d connects an end portion of the first bonding portion 22a and an end portion of the second bonding portion 22b at a periphery of the openings 35a or connects another end portion of the first bonding portion 22a and another end portion of the second bonding portion 22b at a periphery of the openings 35a, and extends in the widthwise direction (arrow E direction). That is, the first widthwise bonding portion 22c is disposed at a position where it is closer to the above-described “one end portions” (of the first and second bonding portions 22a and 22b) than the openings 35a with respect to the arrow F direction, and extends in the arrow E direction. Further, the second widthwise bonding portion 22d is disposed at a position where it is closer to the above-described “another end portions” (of the first and second bonding portions 22a and 22b) than the openings 35a with respect to the arrow F direction, and extends in the arrow E direction.

The first bonding portion 22a, the second bonding portion 22b, the first widthwise bonding portion 22c and the second widthwise bonding portion 22d which are described above form a closed region in which the discharging portion 35 is sealed, thus sealing the discharging portion 35.

Further, the third bonding portion 22e bonds the developer bag 16 and the sealing member 19 in a side upstream of the first bonding portion 22a with respect to the peeling direction of the sealing member 19. That is, the third bonding portion 22e is disposed at a position upstream of the first bonding portion 22a with respect to the arrow E direction, and extends in the arrow F direction. The third bonding portion 22e continuously extends in a rectilinear line shape in the arrow F direction.

FIG. 5 is a plan view showing a modified example in this embodiment. As shown in FIG. 5, at a part of the bonding portion 22, the bonding portion 22 may also be continuous by two bonding portions welded with respect to the longitudinal direction (arrow F direction), i.e., by only two curved lines consisting of a first bonding portion 22a and a second bonding portion 22b so as to surround the discharging portion 35.

Specifically, the first bonding portion 22a is formed so as to be flexed (curved) toward an upstream side of the peeling direction, and the second bonding portion 22b is formed so as to be flexed (curved) toward a downstream side of the peel direction. Further, end portions of the first bonding portion 22a and end portions of the second bonding portion 22b are disposed adjacently to each other. Also in this case, a part of the bonding portion 22 forms a closed region for sealing the discharging portion 35 and is capable of sealing the discharging portion 35. However, in this case, the bonding portion 22 is constituted by only the first bonding portion 22a, the second bonding portion 22b and the third bonding portion 22e, and positions of other constituent elements are the same as those described above.

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FIGS. 6 and 7 are plan views each showing a modified example of the third bonding portion 22e. In FIG. 6, the third bonding portion 22e is welded so as to be extended in a rectilinear line shape while being intermittently disposed (while being spaced at predetermined intervals) with respect to the arrow F direction, so that all of portions constituting the third bonding portion 22e are not always continuously welded. In FIG. 7, with respect to the arrow F direction, small circled portions are welded so as to be arranged in a rectilinear line shape at predetermined intervals. Incidentally, the third bonding portion 22e may also be bonded in a manner such that the third bonding portion 22e of FIG. 6 and the third bonding portion 22e of FIG. 7 are mixed (not shown).

Here, of the first bonding portion 22a, the second bonding portion 22b and the third bonding portion 22e, a portion peeled first is the third bonding portion 22e, and the portion peeled secondly is the first bonding portion 22a, and then a portion peeled finally is the second bonding portion 22b. As a result, when the sealing member 19 exposes the openings 35a, the bonding portion 22 is peeled in the order of the third bonding portion 22e, the first bonding portion 22a and the second bonding portion 22b.

In this embodiment, as shown in FIGS. 3 and 4, the peeling direction is the arrow E direction. An unsealing direction is defined as follows. In the case where the peeling is performed by moving the sealing member 19, of the first bonding portion 22a and the second bonding portion 22b between which the openings 35a are interposed, the first bonding portion 22a is peeled earlier. In this way, a direction directed from the first bonding portion 22a peeled earlier toward the second bonding portion 22b is defined as the unsealing direction, i.e., the arrow E direction.

Incidentally, when the sealing member 19 is unsealed (peeled) from the developer bag 16 in the arrow E direction, in some cases, the peeling microscopically advances, also in the third bonding portion 22b, the first bonding portion 22a and the second bonding portion 22b, also in the arrow F direction due to deformation of the developer bag 16 caused by an unsealing force. However, the unsealing direction in this embodiment does not refer to such a microscopically unsealing direction.

Next, a structure and a state of the openings 35a will be described with reference FIGS. 3, 9, 4 and 8. Particularly, of these figures, the figure in which all of the directions of the arrows D, E and F are indicated is FIG. 4 and therefore it is easy to understand the structure and state of the openings 35a when reference to FIG. 4 is made. Here, the arrow D direction (movement direction) is a movement direction of the sealing member 19 (a direction in which the sealing member 19 is pulled by the unsealing member 20). Before the sealing member 19 is pulled, the sealing member 19 seals the openings 35a, but when the sealing member 19 is pulled, the sealing member 19 exposes the 19 openings 35a.

The arrow E direction (unsealing direction) is a direction in which the sealing member 19 is peeled from the discharging portion 35 to unseal the openings 35a. The arrow F direction is a direction perpendicular to the arrow E direction which is the unsealing direction, and is the same direction as an axis of the rotation shaft of the unsealing member 20, and also is a direction in which the plurality of openings 35a and the plurality of connecting portions 35b are alternately arranged.

Each of the plurality of openings 35a has a circular shape. When a discharging property is taken into consideration, an area of the openings 35a may preferably be large. Further, the connecting portions 35b defining the openings 35a may preferably be large (thick) in order to enhance strength of the developer bag 16. Therefore, the area of the openings 35a and

the area of the connecting portions **35b** are required to be balanced depending on a material and thickness of the discharging portion **35** and a force relationship with peeling strength during unsealing described later, and the like, and may be appropriately selected. Further, the shape of the openings **35a** may also be shapes, other than the circular shape, such as a polygonal shape including a rectangular shape or the like, and an elongated circular shape (not shown).

Further, a direction normal to a plane or formation of the openings **35a** may preferably be set so as to permit easy discharge of the developer accommodated in an attitude during image formation. For that reason, in the attitude during the image formation, the openings **35a** are disposed to open downward with respect to the direction of gravitation. Here, "open downward with respect to the direction of gravitation" refers to that the direction in which the openings **35a** open has a downward component with respect to the vertical direction.

As shown in FIG. 3, the fixed portion **16d** of the developer bag **16** is fixed to the fixing portion **18a** of the second frame **18**. The fixed portion **16d** of the developer bag **16** receives a force when the sealing member **19** is unsealed from the developer bag **16**. In parallel to the arrow F direction (FIG. 4) in which the plurality of openings **35a** are disposed, a plurality of fixed portions **16d** of the developer bag **16** are provided (FIG. 8). Incidentally, other than the case where the plurality of fixed portions **16d** of the developer bag **16** are provided as described above, an elongated single fixed portion **16d** in parallel to the arrow F direction may also be provided (not shown). Further, the fixed portion **16d** is positioned in the neighborhood of the openings **35a**. The fixed portion **16d** is a fixed portion necessary during unsealing of the developer bag **16**, and action and arrangement of the fixed portion **16d** will be described later in explanation of the unsealing.

As shown in FIG. 3, the sealing member **19** covers, before use of the cartridge A, the discharging portion **35** of the developer bag **16**, thus confining the developer in the developer bag **16** as described above. The sealing member **19** includes a sealing portion **19a** for covering the discharging portion **35** of the developer bag **16** and a fixed portion **19b**, and is formed in a sheet-like shape. The sheet is formed of a laminate material having a sealant layer, described later, which exhibits an easy-unsealing property, and as a base material for the sheet, polyethylene terephthalate (PET), polyethylene, polypropylene and the like may be used, and may appropriately be formed in a thickness of 0.03-0.15 mm. Further, as described later, the bonding portion **22** is formed by an effect of both of the sealant layer of the sealing member **19** and the material for the developer bag **16**. The sealing portion **19a** is a region of the sealing member **19** in a leading end side of the sealing member **19**, and is a portion of a region in which the discharging portion **35** is sealed. The sealing portion **19a** includes the plurality of the openings **35** and the connecting portions **35b**. By the sealing portion **19a**, until the cartridge A is used, the developer is prevented from being leaked from the inside of the developer bag **16**.

The fixed portion **19b** is a portion of a region which is located in a base end side of the sealing member **19** and in which the sealing member **19** is mounted on the unsealing member **20**. When the unsealing member **20** is rotated, the fixed portion **19b** is pulled, so that the sealing member **19** exposes the openings **35a**. The unsealing member **20** may also be configured to automatically unseal the openings **35a** by receiving a driving force from the apparatus main assembly B. Or, the unsealing member **20** may also be configured to unseal the openings **35a** by causing the user to grip and move the unsealing member **20**. The unsealing member **20** is the rotation shaft provided in the frame, and the sealing member

19 fixed on the unsealing member **20** is pulled, whereby the developer bag **16** in which the developer is accommodated is unsealed.

Next, a method of setting a peeling force of the bonding portion **22** at a desired value will be described. In order to set the peeling force of the bonding portion **22** at the desired value (a minimum force for unsealing (peeling) the bonding portion **22** within a range in which the toner sealing property can be maintained), two methods are principally employed.

In a first method, the laminate material having the sealant layer is used for the sealing member **19** so as to permit easy unsealing. Further, as the material for the developer bag **16**, a sheet material (of, e.g., polyethylene or polypropylene) which is weldable with the sealant layer and which has flexibility is used. The bonding portion **22** is formed by, e.g., welding both of the sealant layer or the sealing member **19** and the sheet material of the developer bag **16**, and by an effect of the both members (materials), the bonding portion **22** can be easily unsealed. By changing a combination of formulation of the sealant layer with the material to be bonded, the peeling force can be adjusted correspondingly to a desired condition. In this embodiment, the sealing member **19** having peeling strength of about 3N/15 mm in testing methods for heat sealed flexible packages according to JIS-Z0238 is used.

A second method is a method in which as shown in FIGS. 3 and 7, the discharging portion **35** of the developer bag **16** is placed in a state in which the sealing member **19** is folded back with respect to a direction (arrow E direction) in which the unsealing advances. For example, in the state of FIG. 3, the unsealing member **20** is rotated in an arrow C direction, so that the sealing member **19** is pulled in an arrow D direction by the unsealing member **20**. As a result, the developer bag **16** and the sealing member **19** establish an inclination peeling positional relationship, as shown in FIG. 3, as a narrow angle Q, which is 90 degrees or less between the surface of the bonding portion **22** of the developer bag **16** and the surface of the sealing member **19** along the arrow D direction in which the sealing member **19** is to be pulled.

It has been conventionally known that the peeling force necessary to separate both members can be reduced by establishing the inclination peeling positional relationship. Therefore, as described above, the sealing member **19** is placed in the state in which the sealing member **19** is folded back with respect to the arrow E direction in which the unsealing advances, so that the sealing member **19** and the developer bag **16** establish the inclination peeling positional relationship at the bonding portion **22** and thus the peeling force can be adjusted so as to be reduced.

The unsealing member **20** is used for the purpose of peeling the sealing member **19** from the developer bag **16** by applying the force to the sealing member **19**. The unsealing member **20** includes a shaft-shaped supporting portion (not shown) rotatably supported at its ends by the second frame **18** and includes the fixing portion **20b** for fixing the fixed portion **19b** of the sealing member **19**. In this embodiment, the unsealing member **20** has a rectangular shaft shape, and on one surface of the rectangular shaft, the fixed portion **19b** of the sealing member **19** is fixed by the rising portion **20b**.

Next, the unsealing of the developer bag **16** will be described with reference to FIGS. 3, 4, and 8-11. In each time series with respect to the order of the unsealing, each of a group of FIGS. 3, 4, and 9(a), and a group of FIGS. 8 and 10(a) shows a state at the same time.

First, as shown in FIG. 3 and (a) of FIG. 9, the unsealing member **20** is rotated in the arrow C direction by transmitting a driving force from an unshown main assembly to the unseal-

ing member 20. Then, rotation of the unsealing member 20 advances, and the sealing member 19 is pulled, so that a force is first exerted on the third bonding portion 22e to peel the third bonding portion 22e ((b) of FIG. 9).

Further, the rotation of the unsealing member 20 advances, so that the force is exerted on the first bonding portion 22a ((a) of FIG. 10). Then, the rotation of the unsealing member 20 further advances, so that the first bonding portion 22a is peeled to start the unsealing of the discharging portion 35, thus exposing the openings 35a ((b) of FIG. 10).

Then, the rotation of the unsealing member 20 advances, so that the force is exerted on the second bonding portion 22b ((a) of FIG. 11). Subsequently, when the rotation of the unsealing member 20 further advances, the second bonding portion 22b is finally peeled and thus the unsealing is completed ((b) of FIG. 11). The developer inside the developer bag 16 is discharged through the openings 35a in an arrow I direction.

In the following, an effect of the third bonding portion 22e will be described. First of all, as a comparison example, in the case where there is no constitution including the third bonding portion 22e, a phenomenon which can occur in some rare cases in a manufacturing process (step) will be described.

Next, the effect of the third bonding portion 22e in the constitution in this embodiment of the present invention in which a possibility of the occurrence of the phenomenon is reduced will be described.

First, the phenomenon which can occur in some rare cases in the case where there is no constitution including the third bonding portion 22e will be described with reference to FIGS. 12 and 13. FIG. 12 shows a developer bag 16 which has the constitution in which there is no third bonding portion 22e and which accommodates the developer but does not include the unsealing member 20 for unsealing the sealing member 19. On the other hand, FIG. 13 is a sectional view of a cartridge A which has the constitution in which there is no third bonding portion 22e and which includes the developing accommodating unit 25.

In a state shown in FIG. 12, i.e., a state in which the sealing member 19 seals the openings 35a of the developer bag 16 in which the developer is accommodated, the following action can occur depending on handling. When an unexpected force with respect to an arrow X direction acts on the first bonding portion 22a, depending on a magnitude of the force, there is a possibility that at least a part of the first bonding portion 22a is peeled.

When at least the part of the bonding portion 22 is peeled, a performance (power) for unsealing (confining) the developer by the bonding portion 22 is weaker than an intended performance. Then, in a process until the cartridge A is delivered to the user and thereafter the user mounts the cartridge A in the image forming apparatus, by the reason of a load or the like during transportation, the peeling of the bonding portion advances to the extent that the developer is leaked out from the developer bag 16, so that erroneous unsealing can occur. At worst, as shown in FIG. 13, there is a possibility that the developer is leaked out from the cartridge A and then a user's hand is contaminated with the developer. Next, the embodiment of the present invention in which the possibility of the occurrence of the phenomenon as described above is reduced will be described.

FIG. 14 shows a developer bag 16 which accommodates the developer and which does not include the unsealing member 20 for unsealing the sealing member 19. In this embodiment, in a state shown in FIG. 14, i.e., in a state in which the sealing member 19 seals the openings 35a of the developer bag 16 in which the developer is accommodated, when han-

dling is effected, e.g., in the case where the unexpected force directed in the arrow X direction is exerted, the following phenomenon occurs. That is, the force is directly exerted on the third bonding portion 22e, not the first bonding portion 22a. For this reason, even when at least a part of the bonding portion is peeled, the peeling is generated first at the third bonding portion 22e rather than the first bonding portion 22a, so that the possibility of the peeling of at least a part of the first bonding portion 22a is lower in this embodiment than in the above-described comparison example.

Embodiment 2

FIG. 15 is a sectional view showing a developer bag 16 in this embodiment. In this embodiment, constitutions and effects of inside members of a cartridge A which are not particularly mentioned are the same as those in Embodiment 1 and therefore will be omitted from description.

In this embodiment, the developer bag 16 includes a container-forming bonding portion 41 for forming a closed space container by bonding inner surfaces to each other. In a direction (arrow E direction) normal to a plane of a portion of the developer bag 16, where the container forming bonding portion 41 is bonded to the developer bag 16, the container forming bonding portion 41 and the third bonding portion 22e at least partly overlap with each other. Incidentally, the container forming bonding portion 41 and the third bonding portion 22e may completely overlap with each other (FIG. 16).

According to the constitutions in Embodiments 1 and 2, in the constitution in which the openings 35a of the developer bag 16 in which the developer is accommodated is sealed by the sealing member 19, it is possible to reduce the phenomenon, that the unexpected force is exerted on the bonding portions 22a and 22b for bonding the openings 35a and the sealing member 19 at the periphery of the openings 35a to peel the sealing member 19. In the process until the cartridge A is delivered to the user and then the user mounts the cartridge A in the apparatus main assembly B, when the sealing member 19 is erroneously unsealed due to a load or the like during transportation, it is possible to alleviate a degree of three disadvantages of leakage of the developer from the developer bag 16, leakage of the developer from the cartridge A, and contamination of the user's hand with the developer.

According to the present invention, in the constitution in which the openings of the flexible container in which the developer is accommodated is sealed by the sealing member, it is possible to reduce the phenomenon that the unexpected force is exerted on the bonding portion for bonding the openings and the sealing member at the periphery of the openings to peel the sealing member.

While the invention has been described with reference to the structures disclosed herein, it is not confined to the details set forth and this application is intended to cover such modifications or changes as may come within the purpose of the improvements or the scope of the following claims.

This application claims priority from Japanese Patent Application No. 199741/2012 filed Sep. 11, 2012, which is hereby incorporated by reference.

What is claimed is:

1. A developer accommodating unit comprising:
 - a flexible container including an opening for permitting discharge of a developer;
 - a sealing member having a bonding portion to seal the opening; and
 - an unsealing member, attached to said sealing member, for unsealing said sealing member,

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wherein said bonding portion includes (i) a first bonding portion extending lengthwise in a direction crossing a peeling direction, (ii) a second bonding portion provided in a downstream side of said first bonding portion with respect to the peeling direction, and (iii) a third bonding portion bonded upstream of said first bonding portion with respect to the peeling direction,

wherein, when said sealing member exposes the opening, said bonding portion is peeled in the order of said third bonding portion, said first bonding portion, and said second bonding portion, and

wherein, when said sealing member exposes said opening, the flexible container is deformed to change a shape of said opening.

2. A developer accommodating unit according to claim 1, wherein said first bonding portion extends in a longitudinal direction of said unsealing member.

3. A developer accommodating unit according to claim 1, wherein said second bonding portion extends in a longitudinal direction of said unsealing member.

4. A developer accommodating unit according to claim 1, wherein said third bonding portion extends in a longitudinal direction of said unsealing member in an upstream side of said first bonding portion.

5. A developer accommodating unit according to claim 1, wherein said third bonding portion extends intermittently in a longitudinal direction of said unsealing member in an upstream side of said first bonding portion.

6. A developing device comprising:

a developer accommodating unit according to claim 1; and
a developer carrying member for carrying the developer.

7. A developer accommodating unit according to claim 1, further comprising a frame for accommodating said flexible container.

8. A developer accommodating unit according to claim 1, further comprising a frame for accommodating said flexible container, said sealing member, and said unsealing member.

9. A developer accommodating unit according to claim 1, wherein said first bonding portion is positioned at a periphery of the opening.

10. A developer accommodating unit according to claim 1, wherein said second bonding portion is positioned at a periphery of the opening.

11. A developer accommodating unit according to claim 1, wherein said flexible container includes a container forming bonding portion bonded so as to form a container having a closed space therein, and

wherein said third bonding portion and said container forming bonding portion overlap with each other with respect to a direction normal to a plane of said flexible container at a position where said container forming bonding portion is bonded to said flexible container.

12. A process cartridge detachably mountable to a main assembly of an image forming apparatus, said process cartridge comprising:

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an electrophotographic photosensitive drum; and
a developer accommodating unit according to claim 1 integrally assembled with said electrophotographic photosensitive drum.

13. An electrophotographic image forming apparatus comprising a process cartridge according to claim 12.

14. A developer accommodating unit according to claim 1, wherein the opening remains sealed to prevent discharge of the developer through the opening after said third bonding portion is peeled.

15. A developer accommodating unit according to claim 1, wherein, when said developing unit is oriented such that said second bonding portion is highest in the direction of gravity, said first bonding portion is positioned above said third bonding portion, and said second bonding portion is positioned above said first bonding portion.

16. A developing accommodating unit according to claim 1, wherein said second bonding portion is a shorter distance from said unsealing member than said first bonding portion is distanced from said unsealing member, and said first bonding portion is a shorter distance from said unsealing member is than said third bonding portion is distanced from said unsealing member.

17. A developer accommodating unit according to claim 1, wherein the opening is arranged between the first bonding portion and second bonding portion.

18. A developer accommodating unit according to claim 1, wherein a lengthwise direction of the opening crosses the peeling direction.

19. A developer accommodating unit according to claim 1, wherein an axis of unsealing member is parallel to the lengthwise direction of said first bonding portion and parallel to the lengthwise direction of said second bonding portion.

20. A developer accommodating unit comprising:

a flexible container including an opening for permitting discharge of a developer;

a sealing member having a bonding portion to seal the opening; and

an unsealing member, attached to said sealing member, for unsealing said sealing member,

wherein said bonding portion includes (i) a first bonding portion extending lengthwise in a direction crossing a peeling direction, (ii) a second bonding portion provided in a downstream side of said first bonding portion with respect to the peeling direction, and (iii) a third bonding portion bonded upstream of said first bonding portion with respect to the peeling direction,

wherein, when said sealing member exposes the opening, said bonding portion is peeled in the order of said third bonding portion, said first bonding portion, and said second bonding portion, and

wherein the third bonding portion extends intermittently in a longitudinal direction of said unsealing member in an upstream side of said first bonding portion.

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